UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/768,617	01/25/2001	Bret S. Clark	3174-000001/CPA	5733

7590 07/16/2003

Harness, Dickey & Pierce, P.L.C.
P.O. Box 828
Bloomfield Hills, MI 48303

EXAMINER
SMITH, TYRONE W

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 07/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/768,617	CLARK ET AL.	
	Examiner	Art Unit	
	Tyrone W Smith	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2 – 8, 10 – 11 and 13 – 19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *2 – 8, 10 – 11 and 13 – 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 2 – 8, 10 – 11 and 13 – 19 rejected under 35 U.S.C. 103(a) as being unpatentable over Murty (4544868) in view of Heinkel (EP 1,071,200 A2).

Murty discloses a three-phase brushless DC motor controller, which includes a source of a direct voltage (Figure 1 #16), an inverter (Figure 1 #18) having a switching circuit for regulating the DC bus current to a fixed level. Figures 4(A-C) and 5(A-C) shows the fix level (Iref). Further, deliver a fixed current in non-overlapping periods. However, Murty does not disclose using the switching circuit for forcing consecutive phases of the motor to share the current at commutation. For example, enabling the transistors such that each phase of the motor has a phase turn on point that occurs before a phase turn off point of the preceding phase.

Heinkel discloses an electronically commutatable motor, which includes a source for direct voltage (Figure 1 item Ubatt) and control module (Figure 2 STE-PWM). The control module drives the output stages in overlapping control phases using PWM control signal or current (see Figure 4). The method used by Heinkel relates to the present invention where each phase of the motor has a phase turn on point that occurs before a phase turn off point of the

preceding phase and able to share fixed current as defined in the claims (column 3 lines 24 – 67 and column 4 lines 1-7).

It would have been obvious to one of ordinary skill in the art at the time of invention to combine Murty's invention of a three-phase brushless DC motor controller with Heinkel's invention of a electronically commutatable motor. The advantage of combining the two would provide a system without the use of a position sensor to assure, during start-up, a desired rotational direction without problems or issues.

Regarding Claims 2-6. Murty discloses shows that the winding energization is controlled by a read only memory (ROM) or programmable logic array (PLA) (Figure 1 #44) which directs the driver circuit (Figure 1 #46) connected to the data lines to supply drive current to the various bridge transistors (column 2 lines 57-68 and column 3 lines 1-7).

Regarding Claims 5, 6, 10, 15 and 16. Murty discloses a shunt resistor (Figure 1 #96) connected in series between the battery and the inverter and the line connects the inverter side of the shunt resistor as an input to the PWM circuit. People skill in the art understand that the shunt resistor or device connected in parallel across other devices or apparatus and diverting some of the current from it. Appreciable voltage exists across the shunted device or apparatus and an appreciable current may exist in it.

Regarding Claims 13 and 14. Refer to the previous rejection regarding DC bus current regulated at a fixed level.

Examiner's Response

3. Applicant's arguments filed June 27, 2003 have been fully considered but they are not persuasive.

Applicant argues that Murty does not disclose the control module delivering a fixed current during non-overlapping periods. Further, Heinkel does not disclose the control module decreasing the DC bus current to one phase while increasing the DC bus current to a subsequent phase such that the fixed current level is shared and such that a sum of the current to first and second is substantially equal to the fixed current level.

Examiner contends that Murty uses switching circuit for regulating the DC bus current to a fixed level in non-overlapping periods. Refer to Figures 4(A-C) and 5(A-C) shows the fix level (Iref).

Examiner believes that Heinkel reads on the new claims as presented. Examiner suggests that the Applicant refer to Figure 4 of the present invention, where the phase turn on points 50 have been advanced in time to occur before the phase turn off points 52. As a result the overlap time *(delta t)* in which subsequent phases share the fixed current provided by the DC bus. This definition is in the specification page 9 lines 1 – 7. Examiner refers back to Heinkel Figure 4 where again the control module drives the output stages in overlapping control phases using PWM control signal or current. The method used by Heinkel relates to the present invention where each phase of the motor has a phase turn on point that occurs before a phase turn off point of the preceding phase, the overlap time in this case is considered *(K-time)* and able to share the sum of the fixed current as defined in the claims. Heinkel combined with Murty still read on the present invention. Examiner does not completely understand the Applicant's definition of Figure 4 and the explanation on page 8 third paragraph of Heinkel. Rejection is based on the claims as presented to the Examiner.

Examiner suggests that the Applicant (1) argue specifically the difference between Heinkel, refer to the specification of Heinkel, and the current invention, (2) amend that claims to overcome Heinkel and Murty and (3) contact Examiner to discuss and possibly end prosecution.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tyrone W Smith whose telephone number is 703-306-5987. The examiner can normally be reached on weekdays from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi, can be reached on (703) 308-3370. The fax phone number for the organization where this application or proceeding is assigned is 703-308-3431.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

Tyrone Smith
Patent Examiner

Art Unit 2837

ROBERT E. NAPPI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800